MONITOR™

M2400 Heating System

Owner's Guide

IMPORTANT : READ THIS OWNER'S GUIDE CAREFULLY AND THOROUGHLY BEFORE INSTALLING OR USING YOUR HEATER.
RETAIN THIS OWNER'S GUIDE FOR FUTURE REFERENCE.

c UL us

SAFETY ALERT SYMBOL ⚠

These symbols appear as important safety precautions and should be understood and followed by the owner to assure safe operation of the heater.

For Quick Reference

		Page
SECTION A:	⚠ Important Caution	1
SECTION B:	Specifications	5
	Special Features	5
	Safety Features	5
SECTION C:	Tools Needed for Heater Installation	6
	Accessories You May Need	7
	Flue Pipe Extensions	7
SECTION D:	Heater Installation	9
	Flue Pipe Clearances	10
SECTION E:	Fueling	15
	Fueling Options Available	15
	External Tank Installation	15
	Empty Fuel Tank	16
SECTION F:	Starting Instructions	17
SECTION G:	Adjusting Room Temperature	18
SECTION H:	Turning Off the Heater	18
SECTION I:	Relighting the Heater	18
SECTION J:	Programming the Heater	19
	Setting the Clock	19
	Programming for Automatic Heater Operation	20
	Manual Operation	20
SECTION K:	Protective Features	21
	Loss of Power-Automatic Reset, Child Lock	21
	Electrical Fuse	21
	Overheat Prevention	21
SECTION L:	Care of the Heater	22
SECTION M:	Troubleshooting Guide	24

2001 COPYRIGHT © MONITOR PRODUCTS, INC.,

SECTION A

IMPORTANT CAUTION

⚠WARNING

USE ONLY CRYSTAL CLEAR KEROSENE. NEVER USE GASOLINE, WHITE GAS, CAMP FUEL OR OTHER FLAMMABLE LIQUIDS. USE OF SUCH FUELS CAN RESULT IN AN EXPLOSIVE FIRE AND CAUSE SEVERE INJURY.

⚠CAUTION

1. Make sure that there is no fuel leakage from fuel tank and fuel pipe joint.

2. Make sure that flue pipe (exhaust pipe, air supply hose) is connected properly.

3. Keep heater clean and do not store any flammable items on or near the heater.

4. Don't use the heater for drying clothes.

5. Should anything abnormal occur in the heater, remain calm, Turn It Off (Do Not Unplug) and contact your Monitor dealer.

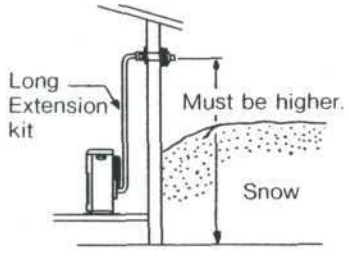
6. Risk of burns.
Flue pipe and louver may have high surface temperature.

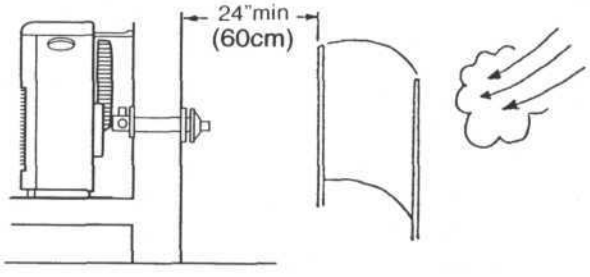
7. Do not place yourself or others too close to the heater.

8. Installation of heater in extreme humidity or dust areas is not recommended.
   Any removal of unit parts or remodeling is strictly forbidden.

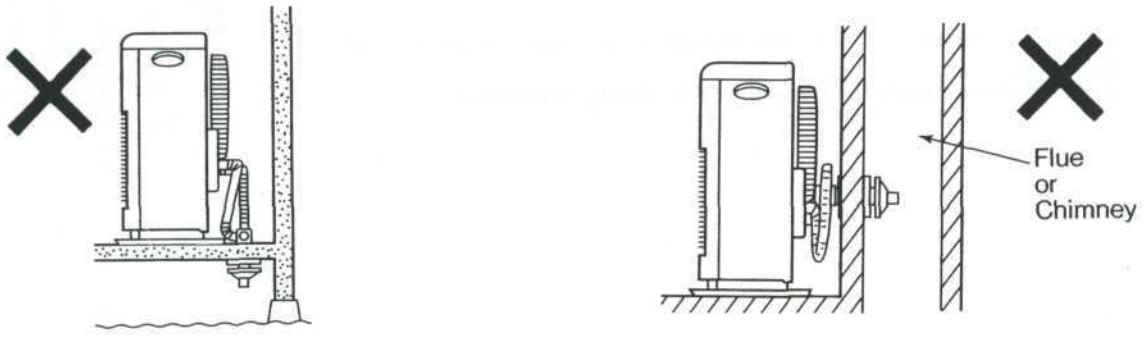
9. Do not sit on the heater.
   Placing ornaments or plants on the heater is not recommended.
   Excess heat may cause damage to ornament or plant and overwatering or spilling of water may cause shock to you or damage to the heater.

10. In areas of heavy snow accumulation, flue pipe may need to be installed higher to avoid being buried.
    In open areas with strong wind, a wind break may be necessary to avoid exhaust gases being blown back into the intake and causing poor combustion.





11. Do not install nor exhaust the flue pipe into a crawl space or underneath floor,nor into a flue or chimney.

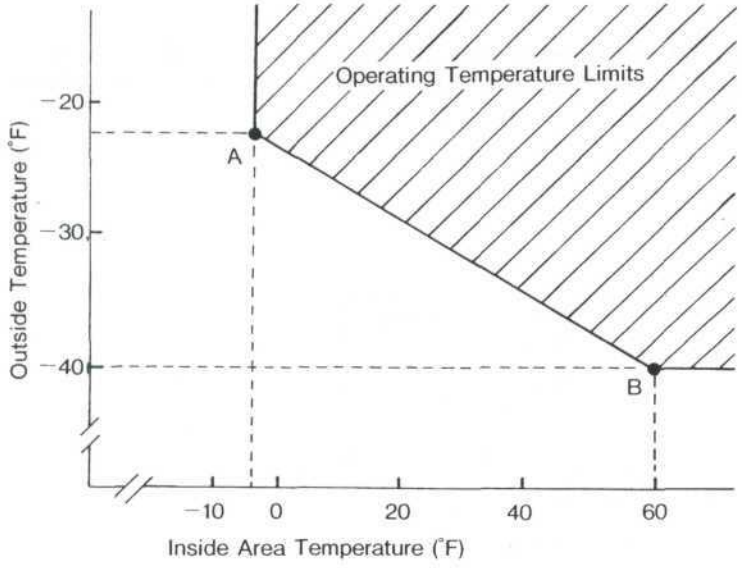


12. **OPERATING ALTITUDES HIGHER LIMITS**

This heater is designed to be used normally up to 3000 feet above sea level. To use over 3000 feet, but not higher than 7000 feet, consult with your dealer on correct air damper use.

13. **OPERATING TEMPERATURE LIMITS**

Please use the Monitor within the range of temperatures indicated by the shaded area shown on the graph below.



Point A
Inside Area Temperature − 4°F
Outside Temperature −22°F

Point B
Inside Area Temperature 60°F
Outside Temperature −40°F

SECTION B

SPECIFICATIONS

Model	Monitor 2400
Fuel Type	Crystal Clear Kerosene
Heater Efficiency	93%*
Heat Rating	High : 43,000 BTU/hour H.Medium : 32,000 BTU/hour L.Medium : 24,600 BTU/hour Low : 16,200 BTU/hour
Heater Output	High : 37,200 BTU/hour H.Medium : 26,900 BTU/hour L.Medium : 20,700 BTU/hour Low : 13,600 BTU/hour
Fuel Tank	Separate (Not supplied with heater)
Fuel Consumption	High : 0.319 Gallon/hour H.Medium : 0.24 Gallon/hour L.Medium : 0.18 Gallon/hour Low : 0.12 Gallon/hour
Power Source	120 Volts AC ; 60 Hz.
Power Consumption	Ignition : 310 Watts Operation : 68 Watts (Average)
Heated Air Delivery	High: 388 Cubic feet/minute H.Medium: 388 Cubic feet/minute L.Medium: 330 Cubic feet/minute Low: 300 Cubic feet/minute
Vent Pipe Hole	2½-inches Diameter
Dimensions	Height: 26.6 inches Width: 28.7 inches Depth: 14.0 inches
Weight	82 Pounds, empty

* Net Efficiency is 88%, A.F.U.E.is 84%

SPECIAL FEATURES

AUTOMATIC IGNITION

MEMORY BACK UP: Set memory can be kept in case of power failure for up to 30 minutes.

DUAL BLOWERS: Separate fans for combustion and room air circulation.

THERMOSTATICALLY CONTROLLED: Adjusts to the desired room temperature.

BUILT- IN TIMER: Heater will automatically operate as programmed by the user.

AUTOMATIC RESET AFTER POWER FAILURE: Heater will automatically resume operation after power is restored.

INDICATOR LIGHTS : Easy-to-see signals show when heater is in operation, when timer is activated, and when the burner is operating.

CHOICE OF FUEL SUPPLY: Connect to separate tank.

MULTIPLE HEAT EXCHANGER: Extracts 88% of heat from burner.

CLEAN OPERATION: Products of combustion are vented outside.

CONSUMES NO ROOM AIR: Air for combustion is drawn from outside.

EASY INSTALLATION: Includes all parts required for standard installation.

SAFETY FEATURES

SAFE RE-LIGHTING: Heater will not restart until its combustion chamber has cooled.

ELECTRICAL PROTECTION: Heater automatically shuts off in the unlikely event of a malfunction in the electrical circuitry or disruption of the power supply.

NO EXHAUST IN ROOM: Products of combustion are discharged outdoors.

FLUE PIPE: Outside air is drawn through a pipe-within-a-pipe venting system. This process preheats combustion air and regains heat from exhaust gases.

⚠ *CAUTION:ALTERNATE POWER SOURCES*

The Monitor 2400 may not operate when powered by sources such as an auxiliary generator, UPS (Uninterrupted Power Source), inverters, etc. Check with your dealer for guidance on specific applications.

SECTION C

Before installing your heater, be sure to check and comply with local and state building and electrical codes that may apply to vented heaters in your area. Permanent wiring must be installed by a licensed electrician.

TOOLS NEEDED FOR HEATER INSTALLATION

Check the following charts to be sure you have all the tools required to install your Monitor 2400 Heating System.

STANDARD TOOLS	APPLICATION
Phillips Head Screwdriver	Installation of Heater Parts
Steel Tape Measure	Taking Measurements
Pen or Pencil	Marking Drilling Location
Exterior Caulk	Caulking Between Packing and Wall
Yardstick or Long Straight Edge	Checking Angle of Hole for Flue Pipe
Soapy Water	Lubricating Sleeve Hardware

SPECIAL TOOLS	APPLICATION
Electric Drill	Accommodating Hole Saw and Drill Bit
2½ inch Hole Saw Attachment	Cutting Hole for Flue Pipe
Long ¼ inch Drill Bit	Drilling Pilot Hole Through Wall
Level	Checking Angle of Hole for Flue Pipe and for checking heater level.

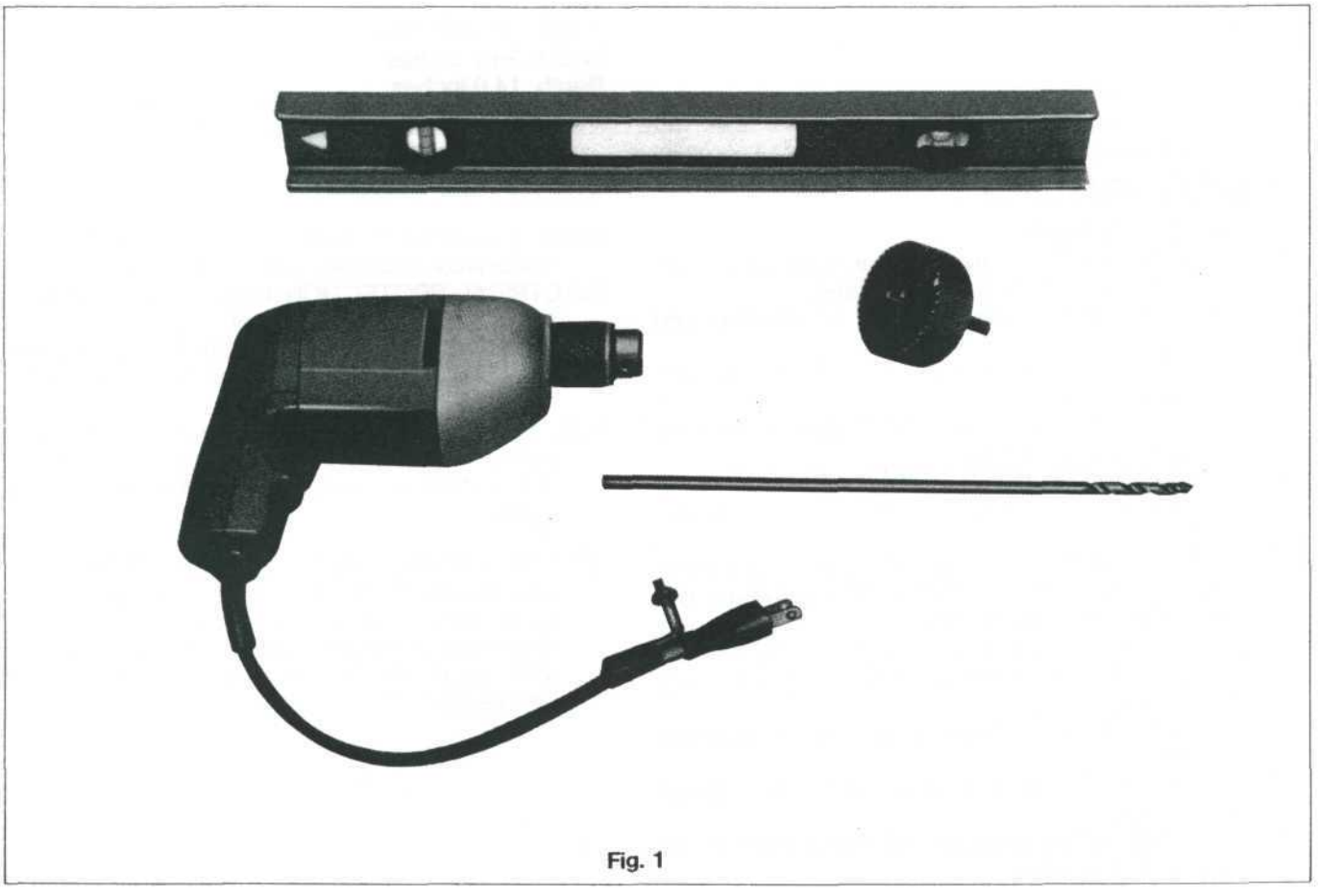


Fig. 1

ACCESSORIES YOU MAY NEED

Check the list below and see your MPI dealer for accessories you may need or want for installation of your heating system.

⚠ *CAUTION: Only use the flue pipe supplied with the Monitor 2400, or the approved accessory kits available from your Monitor or dealer.*

ACCESSORY		APPLICATION
Medium Adjustable Flue Pipe Kit	P/N 8051	For use where wall thickness is up to 12½ inches
Long Adjustable Flue Pipe Kit	P/N 8052	For use where wall thickness is up to 20 inches
Lifter Pump	P/N 1101	For use with large capacity tank where gravity feed is not practical
Extra Short, Short, Medium or Long Extension Kit or Elbow Adapter Kit (See Flue Pipe Extensions, page 7)		For use where "standard" installation is not practical
Fitting and Tank		For large capacity fueling: To be dealer installed

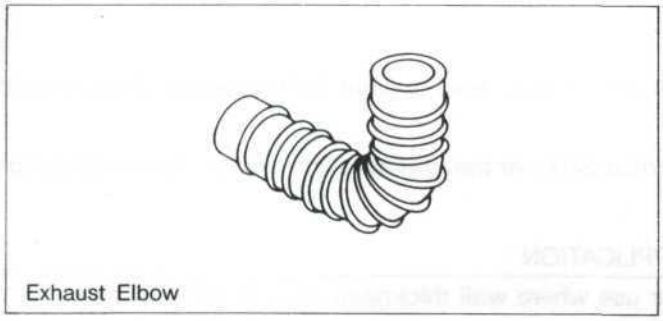
EXTENSION KIT LENGTH		
Extra Short Extension Kit	P/N 8212	7⅛ to 11½ inches (18.2 to 29.2cm)
Short Extension Kit	P/N 8004	11½ to 20¼ inches (29.2 to 51.4cm)
Medium Extension Kit	P/N 8003	20¼ to 38 inches (51.4 to 96.5cm)
Long Extension Kit	P/N 8002	38 to 73 inches (96.5 to 185.4cm)

FLUE PIPE EXTENSIONS

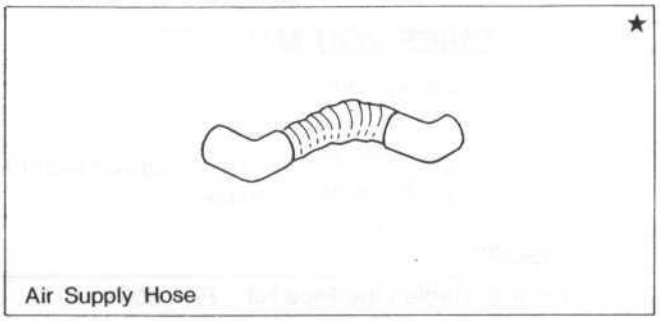
Four standard extension kits are available from your Monitor dealer. Most installations can be made with one of these kits. In special cases, custom installations may be required. These may be made with components purchased from your dealer.

In any installation the following limitations MUST NOT BE EXCEEDED:

1. The total length of the intake or exhaust pipe should not exceed 10 feet (3m) with 3 elbows, 13 feet (4m) with 2 elbows, or 16 1/2 feet (5m) with 1 elbow.
2. These elbows should include the one used at the heater but not the one on the air supply hose nor the integral bends in the flue pipe. (See Figure 2)
3. The correct damper as shown on Page 13 must be used.

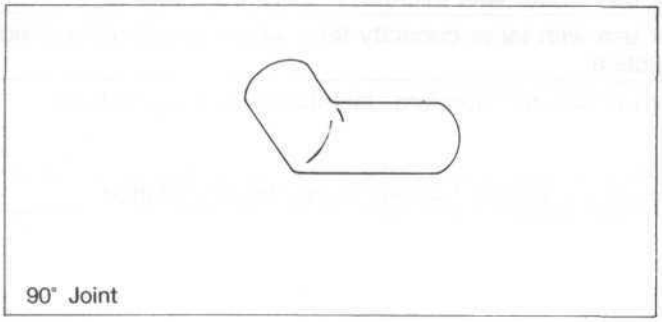


Exhaust Elbow

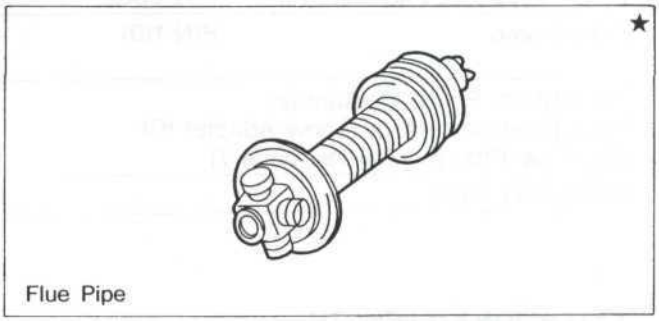


★

Air Supply Hose



90° Joint



★

Flue Pipe

Fig. 2

★ Do not count

SECTION D

HEATER INSTALLATION

Step 1: Fill Out Owner Registration Card

Remove your owner registration card from the plastic envelope containing the owner's guide. It should be filled out and mailed as soon as possible.

Step 2: Check for Parts

Before discarding packing materials, be sure you have located the following:

- Flue Pipe
- Sleeve Nut
- Spill Tray
- Room Temp. Sensor (attached to the rear of the heater)
- Cardboard Template
- "STANDARD" Damper
- "EXTENSION" Damper
- Wall Clamp
- Rubber Packing
- Joint Pipe
- Cloth Insulation Cover
- Outer Flange
- Pipe Holder
- Small Bag of Screws
  - Tapping, Type A – #8x3/4
  - Tapping, Type A – #8x5/16

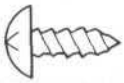
For securing sleeve and wall clamps	 For securing wall clamps
SIZE	
#8×3/4 Tapping	#8×5/16 Tapping

Fig. 3

Step 3: Choose a Location for Your Heater

In choosing a location for your heater, the following guidelines must be considered:

- The heater MAY be installed on combustible floors.
- The area around the heater should be free of obstacles that might interfere with the free flow of air. Allow the clearances shown in Figure 4.

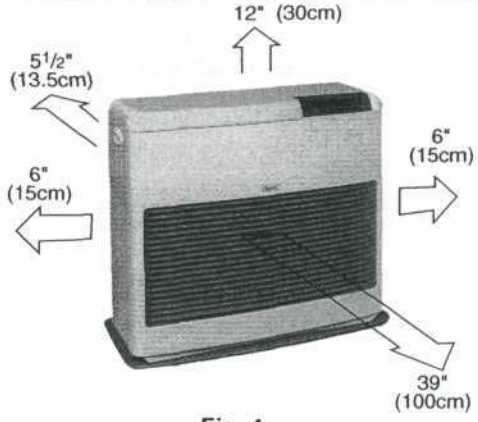


Fig. 4

If the unit is installed so that it is enclosed on both sides and top, the following instructions shall be carried out.

With the side and top clearances as shown in the illustration (Fig. 5a) the front of the Monitor shall be placed so that the front surface protrudes 5 inches (12.5 cm) beyond the enclosure. (See Fig. 5b)

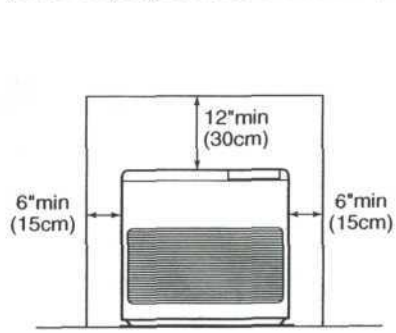


Fig. 5a

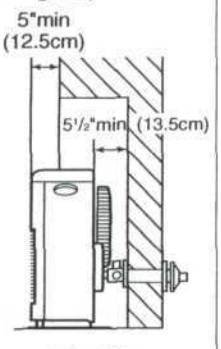


Fig. 5b

⚠ CAUTION:

- The heater must not be installed in a fireplace.
- An AC wall outlet must be within reach of the heater's power cord. Extension cords must not be used.
- The area outside where the flue pipe will emerge should be free of foliage, fuel storage tanks and flammable objects. Air should circulate freely in the area. Allow the clearances shown in Figure 6 on the next page.
- The wall where flue pipe hole will be cut should be free of plumbing pipes, electrical wires, studs, air ducts and other obstacles.

NOTE: Use the cardboard template provided with your heater for flue pipe location.

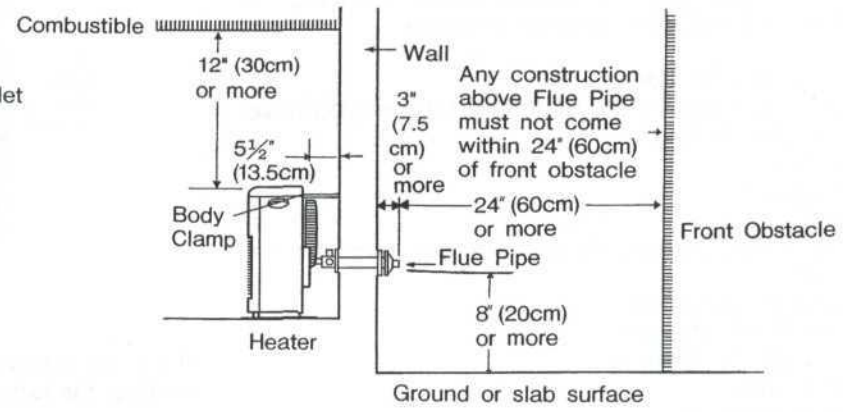
FLUE PIPE CLEARANCES

Flue pipe installations should provide for venting to an unconfined space through which there is a free flow of outdoor air. Clearances to adjacent walls or obstacles must comply with the requirements shown below.

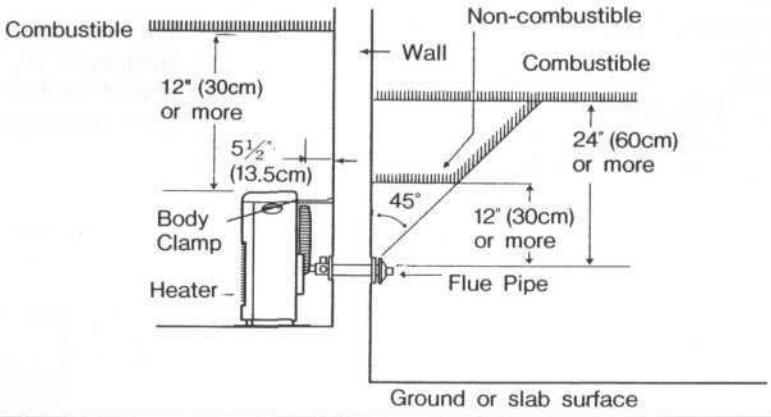
Frontal Clearance

⚠CAUTION:

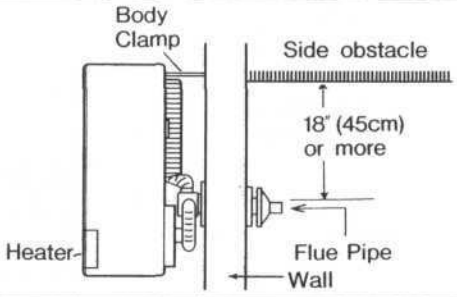
Do not attach anything onto the outlet of the flue pipe.



Overhead Clearance

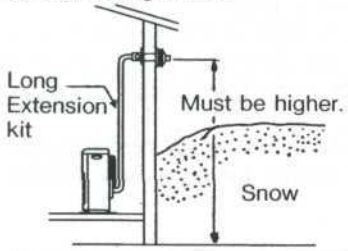


Side Clearance



IMPORTANT:

(1) In areas of heavy snow falls, ground surface clearance must be increased according to average snow falls, to prevent flue pipe from being buried.



(2) In open area with strong wind, a wind break may be necessary.

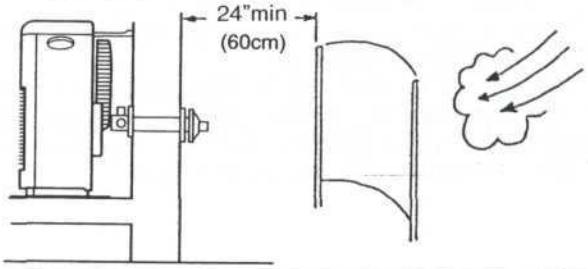


Fig. 6

Step 4: Drill a Pilot Hole

NOTE: The following directions apply to "standard" installation. For other methods, follow instructions included with accessory kits.

Use the template to position the hole to be drilled. The "green dot" indicates the exact center of the hole. Using an electric drill and along drill bit, make a pilot hole through the wall (Figure 7). Be sure the hole extends through the outside wall.

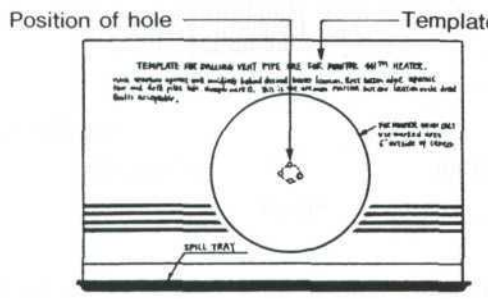


Fig. 7

⚠ *CAUTION: The opening on the inside wall should be approximately 1/4 inch higher than on the outside wall so the flue pipe will slope downward when installed. This will allow condensation to drain outdoors.*

Step 5: Cut the Hole for the Flue pipe

Using a hole saw attachment and an electric drill, cut a 2½ inch diameter hole through the inner and outer walls (Figure 8).

After the hole is cut, use a straight edge and a level to be sure the inside opening is approximately ¼ inch higher than the outside opening.

NOTE: After cutting the inside wall, remove the insulation. Make sure there are no obstructions inside the wall, such as electrical wiring, water pipes, hot air ducts, etc.

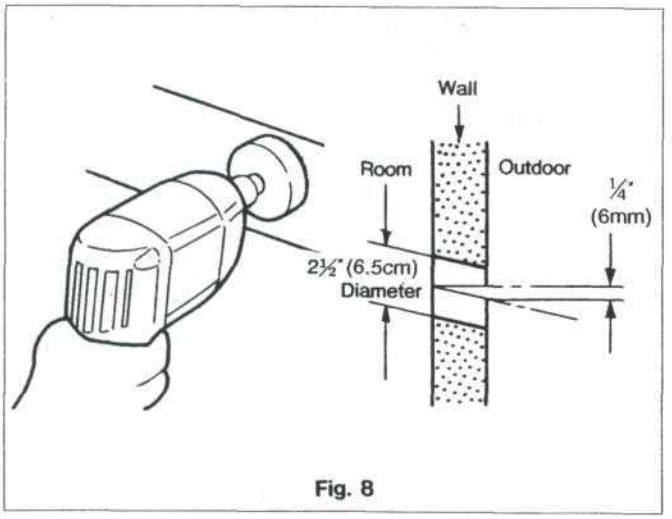


Fig. 8

Step 6: The Flue Pipe is two Sectins, Flue Pipe A and Flue Pipe B
Install the Flue Pipe A

From INSIDE the building, insert the flue pipe A (with arrow pointing "up") into the hole. Fasten the flue pipe with the 3#8× 3/4 tapping screws (Figure9 and 10). (See Figure for screw size and application.)

NOTE: Top center port is an extra exhaust port.

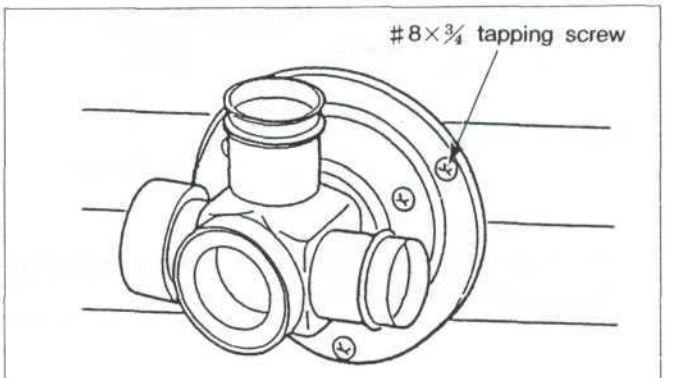


Fig. 9

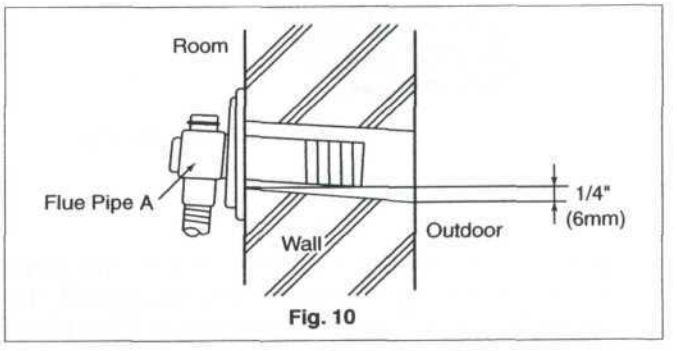


Fig. 10

Step 7:Install Flue Pipe B

Wall Thickness: 5-8½ inches

1. Slide the outer flange and the rubber packing onto Flue pipe B. (Figure 11)

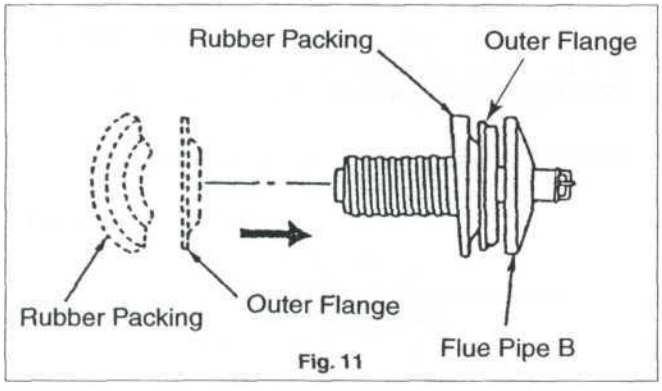


Fig. 11

2. Spread caulking material on the inside of the rubber packing if required. (Figure 12)

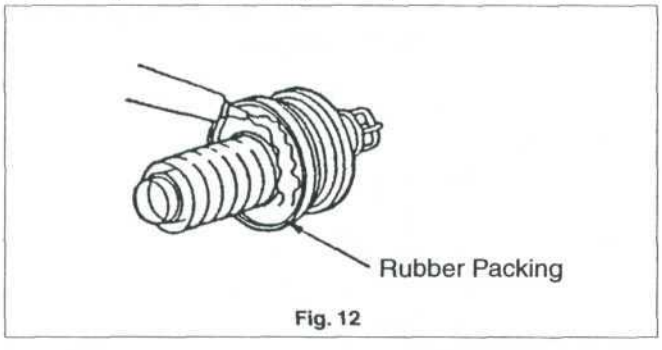


Fig. 12

3. It is imprtant to keep the "UP" mark on the rubber packing at the top while screwing in Flue pipe B. Hold the packing in place while screwing in Flue pipe B until it is the tight. (Figure 13)

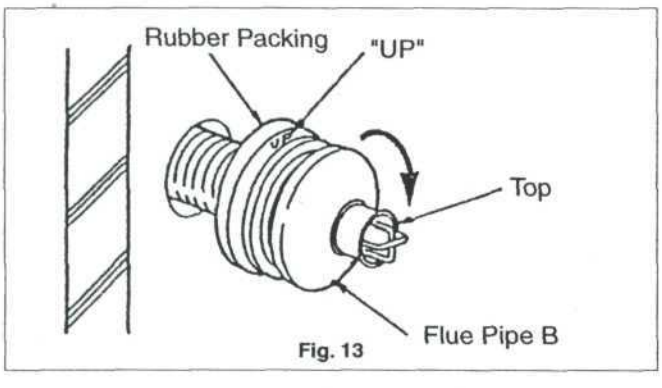


Fig. 13

Wall Thickness: ⅝-5 inches

1. Set the Sleeve Nut t the Flue Pipe B and turn the Sleeve Nut counterclockwise. Side the Outer Flange and the Rubber Packing onto the Flue Pipe B. (Figure 14)

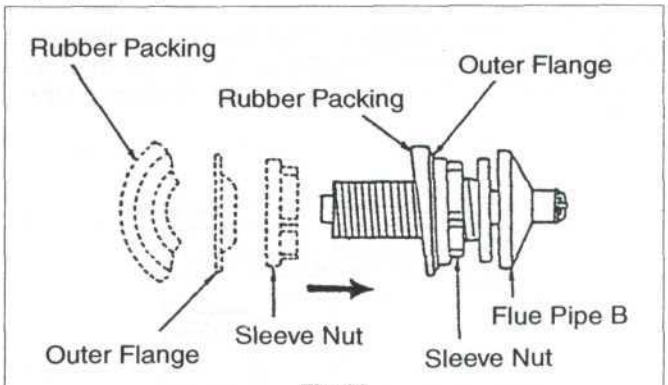


Fig. 14

2. Spread caulking material on the inside of the Rubber Packing if required. (Figure 12)

3. It is imprtant to keep the "UP" mark on the Rubber Packing at the top while screwing in the Flue Pipe B. Hold the Rubber packing in place while screwing in the Flue Pipe B until it is the tight. (Figure 13)

4. Turn the Sleeve Nut clockwise and tighten. (Figure 15)

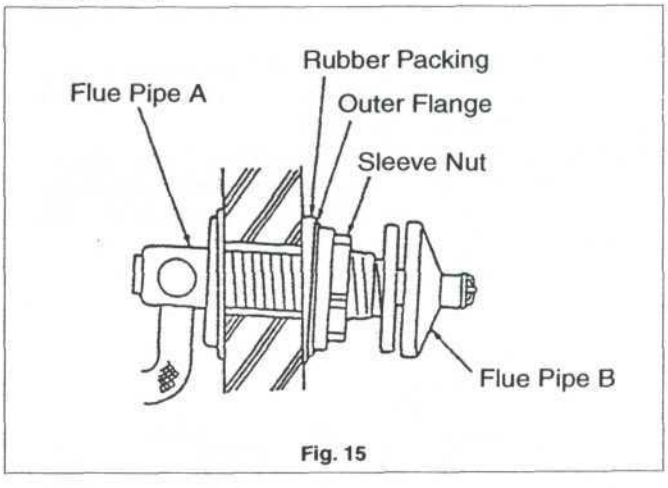


Fig. 15

Step 8: Install the Spill Tray
Place the spill tray on the floor where you plan to locate your heater.
Remove the 2 sets of screws from the cabinet (Figure 16).
Position the heater on the spill tray so the legs of the cabinet fit into the circular indentations in the spill tray (Figure 16).

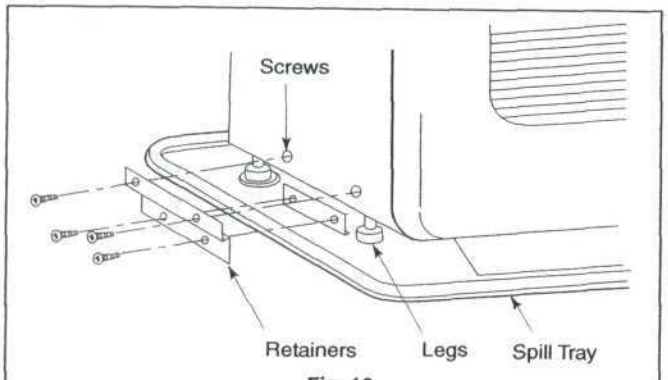


Fig. 16

Step 9: Level the cabinet
In order for heater to operate properly. It must be positioned on a level surface. Ensure proper leveling by adjusting each leg and by using a carpenters level to check both side to side, and front to back level condition.

Attach and tighten both sets of retainers and screws.

Step 10: Install the Joint Pipe
At the rear of the heater, slide the large end opening of the joint pipe into the exhaust port outlet of the heater. Be sure the joint pipe is fully seated. Slide the fabric cover over the joint pipe (Figure 17)
The o-rings that seal the joint pipe may be dry and tight. A little soapy water will ease installation.

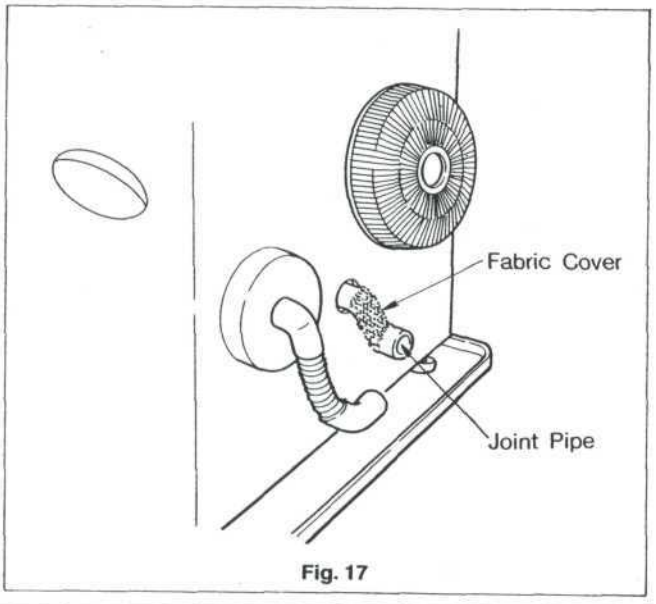


Fig. 17

Step 11: Connect the Heater to the Flue Pipe
Move the heater toward the wall, guiding the joint pipe into the center port of the flue pipe (Figure 18).
Be sure the joint pipe is completely inserted into the flue pipe.

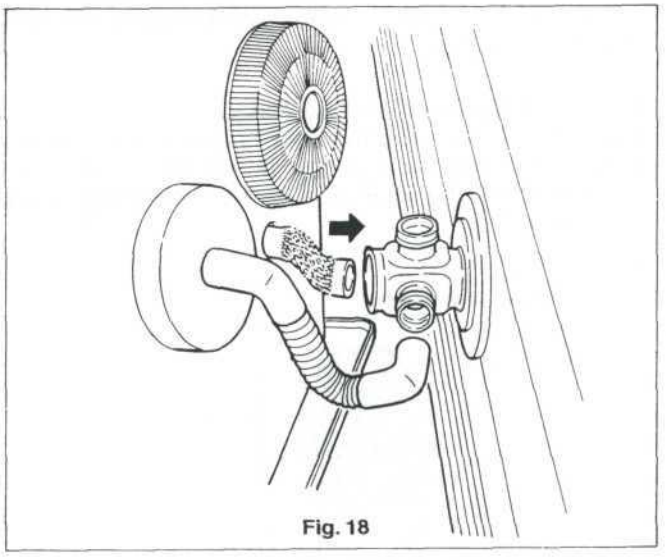


Fig. 18

Step 12: Install the Air Damper
If installation is standard (that is no extension kits are required), place the air damper marked with a "STANDARD" over the air intake flange on the flue pipe (Figure 19).
Place the hose band around the end of the air supply hose. Push the air supply hose onto the air intake flange and secure the hose with the hose band.

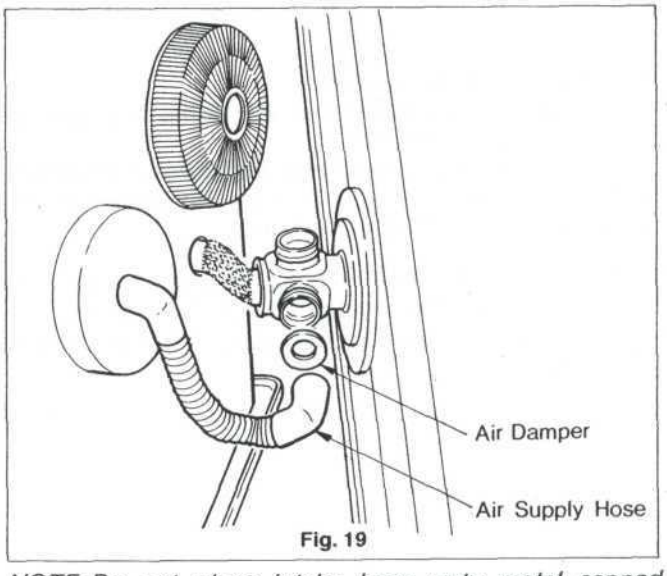


Fig. 19

NOTE: Do not place intake hose onto metal capped exhaust port.

NOTE:

The "STANDARD" damper is to be used with extension kits up to a total overall length of 73 inches and a 1 bend (90° elbow)

The "EXTENSION" damper must be used when extension kit or kits exceed 20 inches and 2 or 3 bends are used.

Step 13: Install the Flue Pipe Holder

Place the ring of the flue pipe holder around the flue pipe. The other side of the holder hooks in a slot directly above the joint pipe at the rear of the heater (see Figure 20).

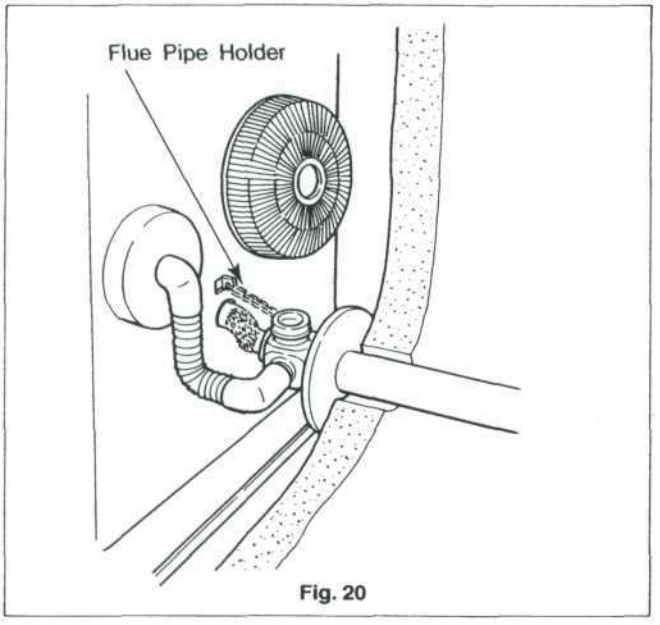


Fig. 20

Step 14: Secure the Heater

Insert the narrow ends of the wall clamp into sockets on the rear of the heater.

Loosen the adjustment screws and extend the clamp until they touch the wall. Fasten the clamp to the wall with 2 #8x¾ tapping screw.

NOTE: If use of wall clamps is not feasible or practical, the heater should be secured by screws to floor through punched holes in spill tray.

Step 15: Recheck the Heater

Before proceeding, check again to be sure there are no flammable materials close to the heater. Check to be sure the heater is level.

Examine the flue pipe to be sure connections are tight.

SECTION E

FUELING

⚠ **WARNING: Use only crystal clear kerosene (Red dyed or clear kerosene or low sulphur #1 oil). Neber use gasoline, white gas, camp fuel or other flammable liquids. Use of such Fuels can result in an explosive fire and cause severe injury.**

FUELING OPTIONS AVAILABLE

Fueling of your Monitor 2400 Heating System can be accomplished in one of 2 ways:

1. **Gravity Fed Large Capacity External Tank:**
   Practical for large heating needs where bulk delivery of kerosene is available. This system should be installed by a qualified plumber or fuel supply technician.
2. **Large Capacity External Tank with Pump:**
   For large heating needs where a gravity fed system is not practical. An electric lifter pump, especially designed for use with your Monitor 2400 heating system, is available from your dealer.

When using a gravity fed tank or pumping system to supply fuel, the inlet pressure to the heater must not exceed 2.5 psi.

NOTE:It is recmmended to install the fuel line on the left side of the unit, with an appropriate shut-off valve, and then across, behind the unit, to the attachment point on the right rear of the heater.

EXTERNAL TANK INSTALLATION- Gravity Fed

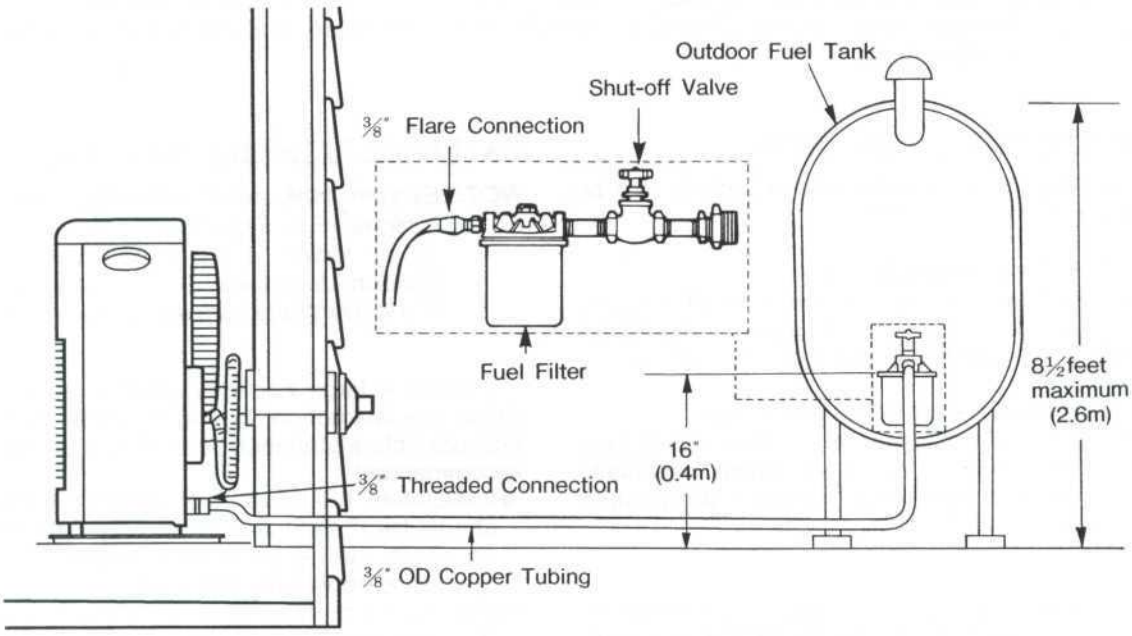
NOTE:External tank installations must comply with the National Fire Prtection Association code NFPA 31 or locally applicable codes, such as the Uniform Mechanical Code, that are cnsistent with NFPA 31. Check with your local building official.

To install a large capacity, gravity fed external tank, follow the instructions below, and refer to Figure 21 for one possible installation. Use of a qualified installer is recommended.

- Installation height of the bottom of the fuel tank should be 16 inches or more above the floor surface on which the heater stands. This ensures that inlet fuel pressure will be sufficient.
- The top of the fuel tank should be no higher than 8½ feet above the floor under the heater. Heights above 8½ feet will exceed the 2.5 psi inlet limit, and a pressure reducer will need to be installed at or near the unit.
- The horizontal length of piping should not exceed 100 feet and should be free of sharp bends or obstructions.
- Piping should include no inverse U-type bends (to avoid air locks, which could block the fuel supply).
- Only ⅜ inch OD copper tubing should be used. The tubing should be bent carefully to avoid crimping.
- A fuel filter is recommended for use on the fuel line near the tank, and a shut-off valve should be installed at the tank.
- A flare adaptor can be used to make a flared tubing connection between the unit and the filter at the tank.
- The fuel tank should be located no closer than 3 feet to a source of heat.
- The fuel tank should have an opening for filling on the top and vent with a weather-proof cap on the side. On some tanks the vent and fill spout use the same opening.

When using a gravity fed tank to supply fuel, the inlet pressure to the heater must not exceed 2.5 psi.

The Monitor 2400 comes equipped with a 3/8" pipe thread connection. A straight, or 90 degree pipe-to-flare fitting or a firomatic valve can be used for the fuel line connection. If a firomatic valve is being used:
Valve Position-Open/Close
Turn counterclockwise to open, clockwise to close. If threaded valve stem is sticking up about ¼", valve is open. If handle screws off stem, valve is closed.



NOTE: Fuel tank must be a minimum 3 feet away from flue pipe.

NOTE2:A fusible link valve should be installed in the fuel line behind the heater.
Check local codes and regulations.

Fig. 21

⚠ *CAUTION: Ensure that there is no fuel leakage from any of the fuel line fittings and connections.*

EMPTY FUEL TANK

If at any time during the operation of your heater you find.

- Display window shows "E14".
- No heat.
- No flame.

You can assume you are out of fuel.
Should this situation occur, take the following steps.

Step 1: Turn the Heater Off
Press the Operation Button to put it in the "Off" position.

Step 2: Refuel
Refill your fuel tank with kerosene.

Step 3: Turn the Heater On
Press the Operation Button to put it in the "On" position.

SECTION F

STARTING INSTRUCTIONS

Step 1: Plug in the Heater
Plug in the AC cord, and route it away from the area of the flue pipe. It is recommended that no other appliance share the same outlet.

Step 2: Prime the Heater
If using the heater for the first time, or if the heater has not been in operation for sometime, press the fuel set lever at the lower right hand side of the cabinet and release it slowly 2 or 3 times (Figure 22).

⚠ **CAUTION:** Do not continue pressing lever repeatedly as this may cause overfilling of constant level valve inside.

NOTE: After a power outage, there is a three-minute waiting period before the unit restarts, provided the ON/OFF switch is in the "ON" position.

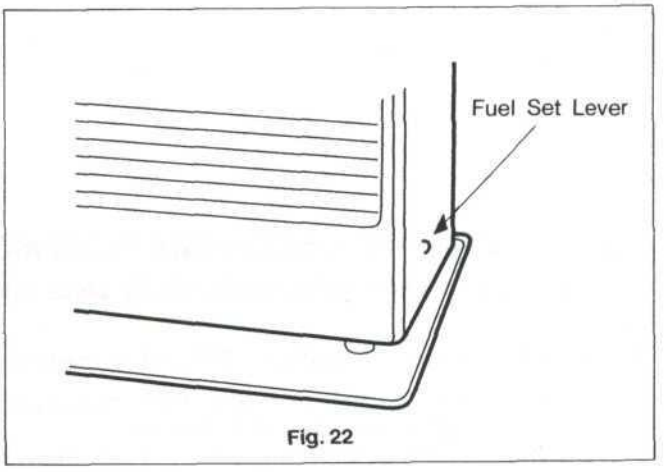


Fig. 22

Step 3: Set "ON" Button
Depress the operation button to put it in the "ON" position. The "Operation Lamp" lights indicating "Set Room Temperature" and "present room temperature". Burner status lamps will light and ignition will start after approximately three minutes. In 5 to 10 minutes the circulation fan will start to operate, and warm air will be felt coming through the cabinet grill.

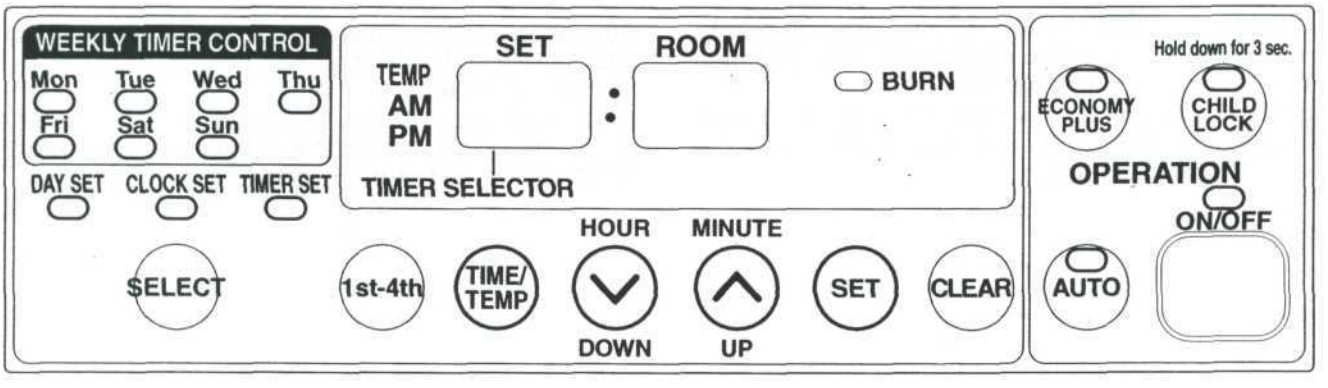


Fig. 23

SECTION G

ADJUSTING ROOM TEMPERATURE

Pressing either the "UP" or "DOWN" button will increase or decrease the set temperature by 2 degrees increments.
Once desired temperature is displayed, press set button to lock into memory.

When the desired room temperature is reached, the heater will automatically shift to "H.Medium", "L.Medium" or "Low" burning mode to maintain the desired temperature.
When room temperature exceeds the desired temperature by approx. 4 degrees, the heater will automatically shut off. As room temperature drops, the heater will automatically re-start to maintain the desired temperature.

INSTRUCTIONS FOR ECONOMY PLUS MODE

To engage the economy plus mode, simply press down the button labeled "Economy Plus", to disengage press again.

NOTE: Operation switch must be "ON" and in manual mode.

This feature minimizes the "ON" and "OFF" cycling of the unit by allowing it to overshoot the set temperature by 8 degrees instead of the normal 4 degrees.
The advantages of this feature are to increase the overall efficiency of the unit by:
1. Decreasing electrical consumption by decreasing the frequency of ignition cycles.
2. Reducing heat loss during the prepurge and postpurge cycles.
3. Reducing inefficient combustion associated with start up and shut down.
4. Prolonging component life by decreasing expansion and contraction of internal parts.

NOTE: This feature could be compared to driving an automobile in stop and go traffic (regular mode) versus highway driving with cruise control engaged (Economy Plus mode).

SECTION H

TURNING OFF THE HEATER

To turn off the heater, press the Operation Button to put it in the "Off" position (Figure 23). The operation light will go out, and the fuel flow will stop.
After turning heater off the fans will continue to run until unit has cooled down to the point where the fans will automatically stop.

SECTION I

RELIGHTING THE HEATER

Automatic controls prevent your heater from relighting after the Operation Button has been set to "Off" until heater has cooled.
If the Operation Button is put in the "On" position during the cooling period, the heater will automatically relight at the end of the period.

SECTION J

PROGRAMMING THE HEATER

SETTING THE DAY OF WEEK AND THE TIME

Step 1:Set the Day of Week

Press the "SELECT" Button, at which time the "DAY SET" Light will illuminate. The "Mon" Light will illuminate and flash at this point.

Illuminate and flash the Light of the current day of the week (e.g.; "Wed") by pressing the "UP" or "DOWN" Button, and then press the "SET" Button to lock into memory. The current day (e.g.; "Wed") light will illuminate continuously.

Step 2:Set the Time

Press the "SELECT" Button, at which time the "CLOCK SET" Light will illuminate. The LED indicator in the Display Window will show *88:88* at this point.

Step 3:Set the Hour

Press the "HOUR" Button until the correct hour (either A.M. or P.M.) appears in the window.

NOTE:The "HOUR" and "MINUTE" Buttons can be pressed and held or pressed momentarily to change the time.

Step 4:Set the Minute

Press the "MINUTE" Button until the correct time appears in the window.

Immediately press the "SET" Button.

NOTE:If the "SET" Button is not pressed within 1minute after the time set, the programming will be cancelled.

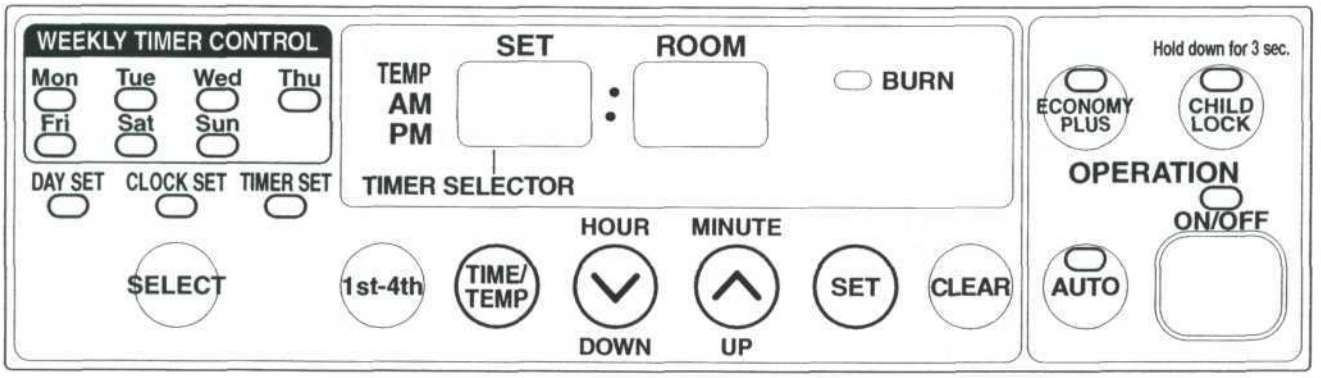


Fig. 24

PROGRAMMING THE WEEKLY TIMER FOR AUTOMATIC HEATER OPERATION

The Monitor 2400 Heating System is capable of providing up to 4 different temperature settings for 4 different times of each day of the week. Not all 4 settings have to be used; 2, 3 or 4 settings can be used. A clear understanding of programming temperatures, time and day of the week from the previous pages is needed before programming the automatic settings. Also, the present time and the day of the week must have been set.
This system is capable of programming Monday to Friday, Saturday and Sunday to same 4 programs as shown in the table or each day can have a different set of 4 programs. Also, this system is capable of programming all 7days to have the same set.
Suggested weekday and weekend programs are shown below;

Suggested Programs

Mon - Fri

	Time	Temperature
1st	6:00 AM	68°F
2nd	8:30 AM	60°F
3rd	5:00 PM	68°F
4th	11:00 PM	58°F

Sat - Sun

	Time	Temperature
1st	7:00 AM	68°F
2nd	10:00 AM	60°F
3rd	4:00 PM	68°F
4th	11:00 PM	58°F

Step 1:Setting the 1st program of Monday
Pressing the "SELECT" Button will illuminate the "TIMER SET" Light. The "Mon" Light will illuminate and flash, and the "TIMER SELECTOR" LED indicator in the Display Window will show "*1* " at this point.
Pressing the "TIME/TEMP" Button will illuminate the ": " Light in the Display Window, and then set the 1st desired time by pressing the "HOUR" and "MINUTE" Buttons. Once the desired time "AM or PM" is displayed, press the "SET" Button to lock into memory.
Press the "TIME/TEMP" Button again. Set the desired temperature for the 1st time setting by using the "UP" and "DOWN" Buttons. Once the desired temp is displayed, press the "SET" Button to lock into memory.

Step 2:Setting the 2nd, 3rd and 4th programs of Monday
Pressing the "1st-4th" Button will show "*2* " at the "TIMER SELECTOR" LED indicator in the Display Window.
Follow same steps as above, except for 2nd time/temp. (ie; 2nd 8:30AM 60°F)
Repeat 3rd and 4th settings by same steps.

Step 3:Setting the programs of Tuesday - Sunday
Pressing the "SELECT" Button will illminate and flash the "Tue" Light, and the "TIMER SELECTOR" LED indicator in the Display Window will show "*1* " at this point.
Follow same steps as above, set the programs of Tuesday. Set the programs of remaining days in the same manner.

Step 4:Setting the program by using Copy function Tuesday - Friday
You can easily duplicate Monday's program for the remainder of the week, or any group of days, by using the Copy function.
After having set the program for Monday, press the "1st-4th" Button until "*COPY* " flashes in the LED display window. Note that "Mon" is also flashing in the Weekly Timer Control panel. To copy Monday's program to Tuesday, press the "*UP* " or "*DOWN* " button to flash the "Tue" light. Both "Mon" and "Tue" lights are flashing.
Press the "SET" button, and "Tue" is steady, and "*COPY* " and "Mon" lights are flashing.
Next. Press the "UP" or "DOWN" button to illuminate "Wed" and then press "SET". "Tue" and "Wed" are both steady, but "Mon" and "*COPY* " are flashing.
Repeat the above sequence for "Thu" and "Fri".
Then hold down the "SET" button for 3 seconds, or until you hear the "BEEP" and observe that "*COPY* " stops flashing. The programs for Tue, Wed, Thu, and Fri are now copied and set.
In about 10 seconds, only "Mon" will be flashing.
Press the SELECT button to select the current day, and the TIME will appear in the display window.

Saturday - Sunday
Follow same steps as above to set the "Saturday" program. (Steps 1 and 2)
Press "1st-4th" button until "*COPY* " flashes in the display window.
Press the "UP" or "DOWN" button to illuminate "Sun" which will flash.
Press "SET" button and "Sun" will light steady.
Then, press "SET" button for 3 seconds, or until you hear the "BEEP" sound and "*COPY* " light stops flashing.
The Sunday program has been copied from Saturday.

Step 5:Activate Automatic Operation
For the heater to operate on automatic once the settings are in memory, simply press the "AUTO" Button on the control panel. The "AUTO" Light will illuminate to confirm the heater is in the automatic operation mode. The heater will now maintain the programmed temp for that time of day of the week.

IMPORTANT: The heater will not operate in automatic unless the ON/OFF switch is in the "ON" position.

Step 6: Clearing An Automatic Setting
If you wish to clear any automatic setting, press the "SELECT" and "1st-4th" Button to the appropriate setting and press the "CLEAR" Button. A new setting will need to be entered otherwise the old setting will return after 1 minute.

MANUAL OPERATION

To deactivate the automatic operation, simply press the "AUTO" Button. The "AUTO" Light will no longer be illuminated and the heater will run on a manual setting. This setting will be determined by the previous auto setting for that time of day, unless reset. The automatic settings will remain in memory even if the unit is running in manual, unless there is a power outage for more than 30 minutes.

SECTION K

PROTECTIVE FEATURES

LOSS OF POWER-AUTOMATIC RESET:

NOTE:If power to the heater is interrupted, a thud-like noise may be heard in the combustion chamber. This is normal, and should not cause alarm.

For power interruptions of up to 30 minutes, the set memory is kept and will resume operation automatically with the set memory.

For power interruptions beyond 30 minutes, your heater will resume operation (after a 3 minutes cool down period) in the MANUAL mode and maintain room temperature according to the previous setting temperature you've selected in case of manual operation before power interruption, the initial setting temperature (60°F) in case of automatic operation before power interruption.

When the heater resume operation, The Display Window will show 88:88 indicating the need to reset the clock and the day of the week for automatic operation.

CHILD LOCK:

NOTE:The CHILD LOCK will help to prevent accidental operation as well as small children from altering controls.

To operate the CHILD LOCK simply hold the "CHILD LOCK" Button down for 3 seconds, or until you hear two short beeps. The function is activated immediately and the "CHILD LOCK" Light will illuminate.
To deactivate the CHILD LOCK simply hold the "CHILD LOCK" Button down for 3 seconds, or until you hear two short beeps. The "CHILD LOCK" Light will go out.
The lock can be deactivated at any time in this way.

During normal operation the CHILD LOCK may be activated and all controls other than the OFF switch will be locked. Deactivating the lock releases the controls. If the lock is activated while the heater is turned OFF, then all functions will be locked. If the heater is Turned OFF while the CHILD LOCK is activated, it cannot be turned ON again until the lock is deactivated.

ELECTRICAL FUSE

In the unlikely event of a failure in the heater's electrical system, a fuse will "blow" and interrupt the power. Do not attempt to change the fuse.

Contact your MPI dealer for the name of a trained and certified service representative in your area.

NOTE: Using a surge protector can minimize the chances of a blown fuse caused by power surges.

OVERHEAT PREVENTION

If your heater overheats, a thermostatic switch will automatically stop the flow of kerosene and extinguish the flame. The Display Window shows "E 14".

Restore heater operation by following the steps below

NOTE:Other symptoms listed in the trouble shooting chart may cause the display window to show "E 14", besides an overheat situation.

Step 1: Turn the Heater Off
Press the Operation Button to put it in the "Off" position.

Step 2: Allow the Heater to Cool
Wait approximately 30 to 45 minutes for the heater to cool completely.

Step 3: Unplug the Heater from the Wall Outlet.

Step 4: Remove Obstructions
The overheated condition may be caused by obstructions blocking the air flow to the heater . Check:

- The front of the heater
- The circulation fan (on the back of the heater).
- The flue pipe (outside)

Step 5:Remove the Front Cover Assy
Remove the screws at the Front Cover Assy, and carefully remove the Front Cover Assy.

Remove any accumulation of dust or other matter that may be covering the burn chamber and the heat exchangers inside the heater.

Step 6:Replace the Front Cover Assy

Step 7: Plug in the Heater

Step 8: Re-program the Heater

Step 9: Turn Heater On

⚠ *CAUTION: If the unit overheats a second time, turn it off and contact your MPI dealer for service.*

SECTION L

CARE OF THE HEATER

Push operation switch to "OFF" remove the AC Plug from the wall outlet and wait approximately 30 minutes for the heater to cool before performing any of the following steps.

Step 1: Retrieving Objects from Inside the Heater
Should an object fall inside the heater, through the grill openings, it must be removed to avoid affecting the operation of the heater.
After allowing the heater to cool, remove the front cover panel. (See Step 5 of the previous section.) After the object has been removed, replace the front cover before attempting to re-start the heater.

Step 2: Cleaning the Cabinet
When the cabinet is soiled, wipe it with a damp cloth. Restore the shine with a dry cloth.
The use of abrasive household cleaners may dull the finish.

Step 3: Checking the Flue Pipe
At the beginning of each heating season, check the inside of the flue pipe. Foreign matter, spider webs, etc. must be removed.
Be sure all fittings and joints are tight.

Step 4: Cleaning the Interior
Remove the Front Cover Panel (as described in Step 5 of the previous section), and vacuum and wipe away dust or other accumulation.
Look for signs of fuel leakage around the joint pipe and the bottom of the cabinet. If fuel is detected, wipe it away and if necessary, contact your MPI dealer for any necessary repairs.

Step 5: Cleaning the Blower Guard
Heating efficiency will be reduced if the blower guard at rear of the cabinet is blocked with dirt or dust. Blockage also produces a rise in heat that could cause the heater to shut off.
Wipe the guard clean at least once a week.

Step 6: Cleaning the Fuel Strainer
The strainer of the fuel constant level valve should be cleaned once a year and before storing heater at the end of each season.

Step 6-A:
Turn knob of the shut-off valve installed at the external tank to close the fuel line.(See Figure 21)

Step 6-B:
To drain off upper portion of the fuel constant level valve, back out the phillips head screw which is located below and to the left of the strainer cover. (See Figure 23.)

Step 6-C:
To catch the fuel which will drain out, set the drain guide made of cardboard below the strainer cover, with a small container under it. (See Figure 25)

Step 6-D:
Loosen the two screws from the strainer cover and remove cover.

Step 6-E:
Remove the strainer and spring and wash with pure kerosene. If strainer is damaged, replace it.

Step 6-F:
Return the strainer and its spring to their original position. Replace the strainer cover and tighten screws securely.

Step 6-G:
Wipe away any spilled kerosene.

Step 6-H:
Turn knob of the shut-off valve to open fuel line.
Check for any fuel leakage.

NOTE: Your Monitor may sometimes require more service than that shown above. Should this occur please contact your Monitor Products, Inc., dealer for service. A preseason maintenance check up should be performed by your dealer to ensure trouble free operation during the season. Ask him for details of his routine maintenance program.

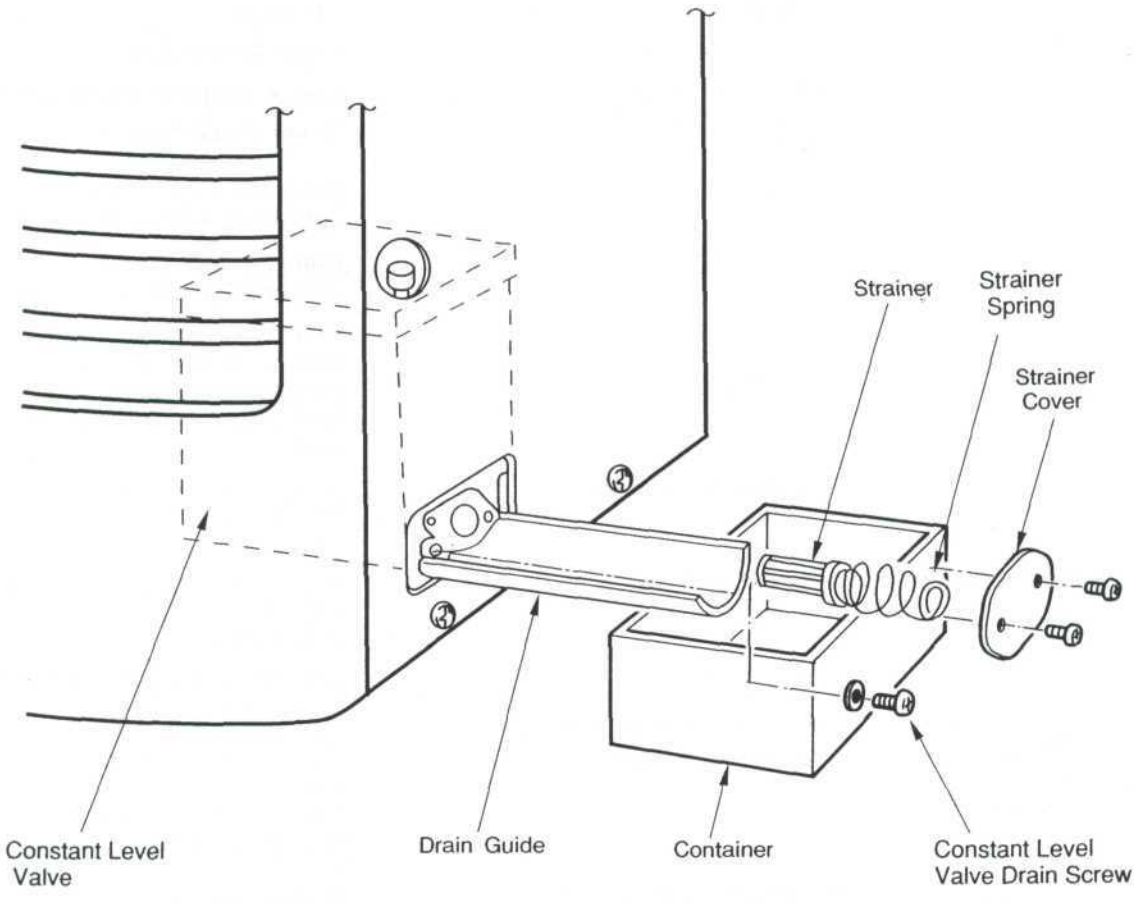


Fig. 25

Step 7: Storing the Heater

During summer months or long periods when your heater will not be in operation, take the following steps:

- Clean off the exterior cabinet with a damp cloth, and brush or vacuum dust from the grills.
- Cover the heater to protect it from dust.
- DO NOT DISASSEMBLE the heater or extension kits. Replacement of lost parts is an unnecessary expense.
- Shut off fuel supply to unit.
- Disconnect or shut off power supply to unit to prevent possible damage from lighting or power surges.

SECTION M

TROUBLESHOOTING GUIDE

Should symptoms appear during the operation of your heater, refer to the chart below, If you are unable to restore normal operation, contact your MPI dealer for service.

SYMPTOM	CAUSE	REMEDY
Heater does not go on with operation switch.	Timer is in Auto.	Press Auto Button again.
	AC cord is disconnected from wall outlet. Power failure.	Check plug and power source. Reset circuit breaker.
	Out of fuel.	Press the fuel set lever at the lower right hand side of the cabinet.
	Igniter Failure.	Call your MPI Dealer for Inspection and/or Replacement.
	Water in fuel.	Refill with fresh kerosene. Section L. *Note: If strainer is severely clogged, contact your Monitor dealer to check and clean the inside of constant level valve and pump screen.*
	Clogged fuel strainer.	Clean fuel strainer. See "Care of the heater" Section L.
Heater extinguishes after lighting.	Air pocket in fuel line.	Press fuel set lever on lower right hand side of the cabinet and release slowly 2 or 3 times.
	Out of fuel.	See "Empty Fuel Tank" Section E.
Erratic changes in room temperature. (Slight differences in room temperature are normal.)	Poor location of heat sensor. Poor air movement.	Relocate the sensor. Make sure clearances are kept around unit. Add room fans to better circulate air throughout area.
Automatic timer does not start heater.	Operation switch is not in the "ON" position.	Depress operation button to "ON" position.
	Timer is in Manual.	Press Auto Button.
	Timer improperly programmed.	See "Programming for Automatic Opearation" Section J.
	Power interruption.	See "Loss of Power", Section K.
Flame does not reach normal size.	Heater is not level.	Check level.
Poor flame, sounds of combustion, soot at the rear of the heater.	Loose flue pipe.	Allow heater to cool completely; tighten all connections.
Soot on inside of burner window or exhaust ports of flue pipe.	Obstruction of combustion air intake system or combustion fan failure.	Inspect air intake system and air supply elbow for blockage. Clean with a brush,if necessary, and carefully reconnect.
Heater switches from automatic to manual operation: display window shows 88 : 88.	Power interruption; automatic reset.	See "Loss of Power", Section K.

NOTE: Several of the symptoms mentioned above may also be signs that your unit is due for routine maintenance, especially if it is several years old. Contact your Monitor dealer for an appointment.

Monitor 2400™ Vented Heating Systems Limited Warranty

MONITOR PRODUCTS, INC., warrants each MONITOR 2400 vented heating system sold by it to be free from defects in material and workmanship, under normal use and service, for one year after the date of original retail purchase, subject to the term and conditions stated below. An extended parts only warranty period of 48 months is provided for combustion chamber and heat exchanger. The remainder of the unit is subject to the 12 months warranty as provided herein.

1. WARRANTOR: This warranty is granted by MONITOR PRODUCTS, INC., P.O. Box 3408, Princeton, New Jersey 08543.

2. PARTIES TO WHOM WARRANTY IS EXTENDED: This warranty shall be extended only to the original retail purchaser.

3. PARTS COVERED: All products and parts manufactured by or for MONITOR PRODUCTS, INC., except as provided for herein. Replacement parts are warranted only for the balance of the original warranty period.

4. PARTS NOT COVERED: The following parts are not covered by this warranty: fuel filters, venting kits, extension kits, fuses, and all parts damaged by lightning.

5. REMEDY: If, within the applicable warranty period, any product or part included in this warranty proves to be defective in material and/or workmanship, then MONITOR PRODUCTS, INC., shall repair or replace, at its option, the defective product or part. Service at the point of installation (not including dealer travel time) will be provided at no charge to the customer, but must be performed by a MONITOR PRODUCTS, INC., dealer authorized to sell and service the MONITOR 2400 vented heating system.

6. PROCEDURE FOR OBTAINING PERFORMANCE UNDER THIS WARRANTY: In order to obtain performance of the obligations under this warranty, the original purchaser must promptly (in no event later than thirty (30) days after discovery of the defect) notify the local MONITOR PRODUCTS, INC., dealer authorized to sell and service the MONITOR 2400 vented heating system. Service will be provided during normal business hours within a reasonable time after the dealer has been notified of the need for service. If you are unable to locate a local MONITOR PRODUCTS, INC., dealer authorized to sell and service the MONITOR 2400 vented heating system, call or write to: SERVICE DEPARTMENT, MONITOR PRODUCTS, INC., 7A Marlen Drive, Robbinsville, NJ 08691, (609) 584-0505

   Any claim made under this warranty must be accompanied by proof of original purchase date sales invoice or cancelled check showing serial number is satisfactory evidence.

7. SOLE REMEDY: The remedy and liability for any breach of warranty, express or implied, set forth above is the sole and exclusive remedy and the limit of liability for any such breach.

8. EXCLUSIONS AND IMPLIED WARRANTIES: THIS WARRANTY DOES NOT EXTEND TO ANY DEFECT DUE TO THE NEGLIGENCE OF OTHERS, FAILURE TO INSTALL, OPERATE OR MAINTAIN THE HEATER IN ACCORDANCE WITH THE INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS FURNISHED WITH EACH NEW HEATER, UNREASONABLE USE, ACCIDENTS, ACTS OF GOD, FIRE, SNOW, FLOODS, LIGHTNING, ALTERATIONS, ORDINARY WEAR AND TEAR, THE USE OF UNAUTHORIZED OR NON-STANDARDIZED PARTS OR ACCESSORIES OR THE USE OF ANY FUEL OTHER THAN GOOD QUALITY KEROSENE SUCH AS 1K GRADE. ALL IMPLIED WARRANTIES, IF ANY, ARISING UNDER STATE LAW IN CONNECTION WITH THE SALES BY MONITOR PRODUCTS, INC., OF ANY NEW HEATER ARE LIMITED IN DURATION TO THE DURATION OF THIS WRITTEN WARRANTY. THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE WHICH EXTEND BEYOND THIS WARRANTY MONITOR PRODUCTS, INC., SHALL NOT BE RESPONSIBLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES. WHETHER AS A RESULT OF BREACH OF WARRANTY, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHERWISE.

NOTE: SOME STATES DO NOT ALLOW: (A) LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS; OR (B) THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.

9. NO VARIATION OF TERMS: THE PARTIES INTEND THAT THIS WARRANTY BE THE EXCLUSIVE AND FINAL EXPRESSION OF AGREEMENT.
   No person has the authority to orally, in writing or in any other way vary the terms, conditions or exclusions, of this warranty or to make any express warranties other than those contained herein.

10. LEGAL RIGHTS: This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Monitor Products, Inc.
7A & 7E Marlen Drive
Robbinsville, NJ 08691

COPYRIGHT © 2001 MONITOR PRODUCTS, INC.,